

Flight

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

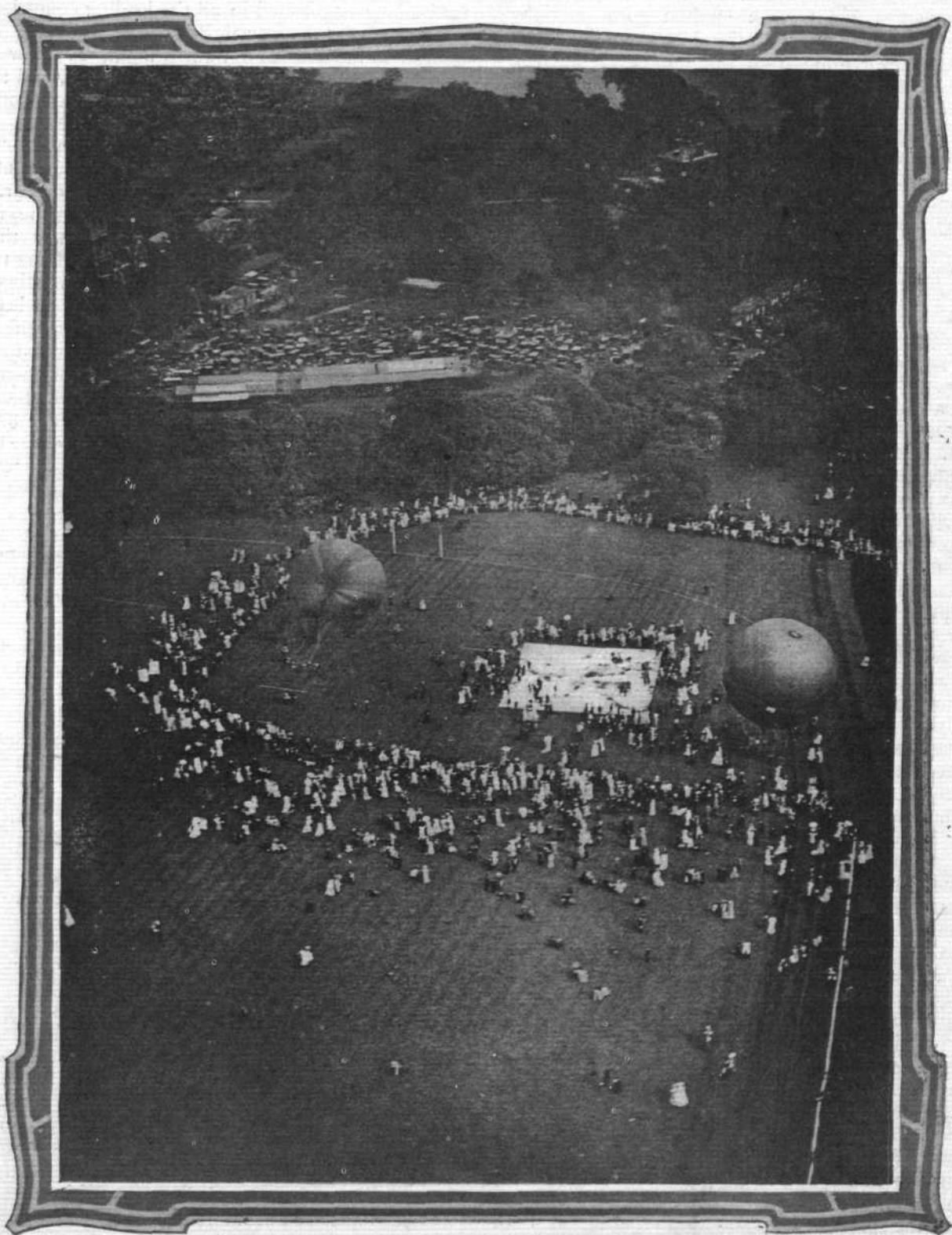
OFFICIAL ORGAN OF THE AERO CLUB OF THE UNITED KINGDOM.

No. 25. Vol. I.]

JUNE 19TH, 1909.

[Registered at the G.P.O.]
as a Newspaper.

[Weekly, Price 1d.
Post Free, 1½d.]



LEAVING HURLINGHAM GROUNDS, ON MAY 30TH, 1908, IN THE BALLOON "LE NEPHTYS."—
Below are seen two other balloons waiting to be called "on the mat" by the starter; and behind the row of trees
will be noticed the huge gathering of motor cars of members and their friends garaged during the afternoon's sport.

Photo by Dr. W. J. S. Lockyer.

PROGRESS IN A FRESH DIRECTION. THE MONOPLANE—THE RACER OF THE AIR.

IN the very active world of flight progress comes to light in gushes. At least, that is the situation that obtains as far as the public is concerned. Students and the relatively few who are initiate in the matter of the endeavours that are being made towards the advancement of the science in its various phases are well aware that the moments of striking achievements that attract attention throughout the civilised world are merely the fruits of years of patient and, for the most part, obscure, if not actually secret, endeavour. It takes long trial to reach a crowning point. The public goes only by demonstration. That is why the history of inventive progress dates everything from the time that practical results are achieved. Thus, when the history of flight comes to be written in future generations, it will be found that up to the period of a month ago successful flight with heavier-than-air machines will be recorded as having been to the credit of biplanes, for to that period it will be said that, beyond demonstrating their superiority in the matter of speediness, monoplanes could not match the other points of utility revealed by the leading types of biplanes, in that, with possibly one exception—namely, the flight of M. Bleriot from Toury to Arthenay and back with one halt *en route*—monoplanes had only fluttered. During the last three weeks, however, Mr. Hubert Latham has leapt into sudden fame by a series of astonishing performances with an "Antoinette" monoplane, which, it chances, is not even one of latest design; while within the last week the indefatigable and plucky M. Bleriot has done an utterly unprecedented thing for any heavier-than-air type of machine by driving one of his large monoplanes in a flight with a total of three people on board.

It is the combination of these two sets of performances that indicates that the monoplane has "arrived." Mr. Latham has demonstrated duration of flight to a sufficient extent to prove to the satisfaction of intelligent folk that, under favourable weather conditions, the flying of the Channel would be a mere theatrical performance on his part, just as it would for any thoroughly trained sportsman put in charge of a Wright biplane, to name but one type. That is to say, those two classes of machines have been proven capable of remaining in the air, a monoplane for well over an hour, and a biplane for over two and a quarter hours, without alighting. But whereas in the case of the biplane the public mind has been prepared for six or eight months past for almost any performance in units of hours in the matter of durability, when we turn to the monoplane it is merely within the last three weeks that the necessary proof of the potential range of use and duration of flight of these machines has been supplied. Among other points it bears out the line that has always been adopted in these pages, that power flight will not be confined to any one make of machine. There are fundamental principles that man has had to comply with when building watercraft, and those principles have been learnt only as the result of trial and error, for the savage races that evolved crude boats and "dug-outs" for themselves did so merely by essay and observation, the most suitable type for their needs being evolved as the inevitable result of generations of making shift. In the matter of aircraft, more scientific and less haphazard methods have been adopted, but the nature of the process is precisely the same in both

cases. Knowledge of what may be called the phenomena of flight has been gradually and painstakingly gained, frequently at the cost of human life and through generations of investigation, often interrupted for long spells, and not occasionally of a kind wherein there has been an overlapping of labours owing to the non-existence in former years of means of keeping experimenters informed of the fruits of trials carried out by fellow-workers in the same field of science. Those dark days are overpast. By reason as well of the aeronautical institutions established in all the leading countries of the world, as of the special Press that is being devoted entirely to the science of human flight, it is now possible to economise all that dissipation of effort, and to codify what certain knowledge has been acquired concerning the phenomena of the subject.

Let us put the matter in popular parlance. "If you had a tea-tray and a sufficiently light and powerful motor, together with effective propellers, nothing on earth could prevent your flying if you once got up the requisite speed," observed a student of aeronautics the other day. And there is a deal of truth underlying the quite conscious and intentional exaggeration of wording. This question of flying with monoplanes seems to lead us to the conclusion that up to the stage of present achievement, but under all reservation as concerns the future, these single surface machines have called for an eminently sporting class of man. For example, M. Bleriot has probably had more miraculous escapes than any other living man; M. Esnault-Pelterie is a man whose temperament combines all the dash and daring of the sportsman with amazing engineering ability; and Mr. Hubert Latham has certainly displayed a deal of "devil-may-care" conduct that affords about the most striking contrast conceivable with the cautious, calculated and infinitely patient method of procedure followed by such men as Wilbur and Orville Wright, for example. There is something Byronic in the methods of the latest "Frenchman of English blood" to leap prominently into the public view in connection with human flight. Of Mr. Latham, it may be said that he awoke one morning to find that he had a motor that could work, so he set it going and it made his machine fly, and himself famous. Not for him the cautious system of increasing flights at the rate of ten minutes each day. As long as his machine would keep in the air, so long would he have it to stay there with himself aboard. That is the spirit that has in a large measure enabled the single-surface machines to come once more within close range of the most successful performances that have yet been made with two deckers. The purely scientific class of flying-man will not utter a word concerning what he hopes to do on the morrow; the intrepid sportsman of the Latham type wagers with his friends that he will cross the Channel by air before the first of August. Now that the preliminary scientific work is at an end we are in need of such men, because their delight and their real bent is in demonstration. They revel in "breaking the record," and reck not for risks run. Of course, there must be the inevitable toll of accidents; but in view of the magnitude of such a thing as the achievement of enabling mankind to ride the air at will, we must expect to pay the usual price in human life. Meantime, it is extraordinary that so much has been achieved at numerically so small a cost.

LANCHESTER'S HYPOTHESIS, LANGLEY'S ERROR AND A REVIEW OF THEIR THEORIES.

OUR article entitled "Flight according to Lanchester," which appeared in the issue of May 22nd, has aroused a very considerable amount of interest and not a little correspondence, some of which has led us to believe that a few further remarks on the subject might be appropriate. In the first place it is necessary to correct an impression that Mr. Lanchester himself wrote the article in question, in case there should be in that article any word or sentence which is not strictly expressive of Mr. Lanchester's own point of view. We were particular to point out in our introduction that the basis of the article was a lecture delivered by Mr. Lanchester from notes which were not published. In order to deal with the subject adequately it was therefore necessary to write editorially, but this, needless to say, could not have been undertaken in the manner adopted without a previous familiarity with Mr. Lanchester's line of thought, as set forth in his work on Aerial Flight.

It seemed to us an excellent opportunity for putting before our readers a fairly concise summary of Mr. Lanchester's theories, in simple language and deprived of their mathematical analysis. It was hardly to be expected, and certainly not to be desired that any such summary should be completely satisfactory to readers of very serious and enquiring minds, who must of necessity go to the author's own work for the complete solution of their difficulties. At the same time it has been possible, as we imagined it would be, to introduce our readers to an extremely interesting method of investigating the underlying principles of flight. Mr. Lanchester's theories are a little apt to be assailed by unfair criticism because they do not happen to be deduced from a man-lifting flyer, and do not resolve themselves into a series of cut-and-dried rules for the construction of a practical machine. There is no doubt that Mr. Lanchester has in his time been as keen as anybody upon achieving flight on a full-sized scale, but being of a scientific turn of mind he thought it would not be a bad idea to find out one or two things about the air before he trusted his life to it.

Still Air Experiments.

In accordance with all properly conducted scientific investigations, Mr. Lanchester commenced with the simplest possible state of affairs. He assumed the air to be absolutely still, and he took a plane which was absolutely flat. From his experiments and investigations of the behaviour of the plane, he deduced that advantages would accrue by the use of an arched aerofoil instead of a flat surface. Neither the one nor the other was in itself a complete flying machine regarded from the man-carrying point of view. But it represented the behaviour of one of the most important parts of a flying machine, viz., its supporting surfaces considered by themselves. If a man cannot fly on a supporting surface without a lot of attendant complication associated with his accommodation and that of the machinery, it does not in any way invalidate the researches as to the behaviour of the elementary plane or aerofoil by itself. It does, of course, very considerably complicate the application of the knowledge thus gained, but it cannot reasonably be supposed that with such knowledge it should be more difficult to design a successful machine. The Wright brothers, at any rate, did not despise the theoretical aspect of the problem, although it is sometimes forgotten

now that they devoured books and made laboratory experiments.

When it comes to dealing with the open air, theory as directly applied from indoor work fails, not because that theory is inaccurate, but because it does not necessarily apply to the new hypothesis. If it were possible to define exactly the state of the atmosphere during any particular period under consideration, it would be possible to apply indoor theory with considerable exactitude. But, unfortunately, the atmosphere is such a turbulent fluid that it is impossible to give any such exact definition, and consequently all the latter stages of experiment have to be made by trial and error, with a view to achieving the result which has the best all-round value.

An Equation for Stability.

In connection with the question of automatic stability, for instance, Mr. Lanchester has given a formula which defines the conditions which will enable the machine to avoid falling if struck by a gust. This formula, however, not only specifies the machine, but it specifies the wind gust also, and it is very difficult, not to say impossible in practice, to have gusts made to order. On the other hand, however, it is by no means without interest to be made aware of the conditions required, because even if they cannot be exactly realised, it can throw light on other points which may result in practical improvement. The equation in question, for instance, is as follows:—

$$\phi = \frac{4/H_n^2 \tan \gamma}{I \left(\frac{1}{K} + \frac{1}{cC\rho l \propto \beta} \right)} > 1$$

Where $cC \propto \beta$ are as given on page 297 of FLIGHT, May 22nd, and l is the length of tail, H_n is the height of fall which would give rise to the natural velocity of the machine under consideration, K is defined as a constant by the equation $W = KV^2$, I is the moment of inertia of the machine about its transverse axis, and ρ is the density of air.

Since for stability the expression must be greater than unity, it follows that the factors in the numerator are advantageous when large, and of these the factor, H_n , is a function of velocity, and being present as H^2 , has an enhanced effect when altered, compared with similar alterations in the other factors.

Some Practical Deductions.

It is on this that Mr. Lanchester bases his argument that safety lies in high speeds. Another factor in the numerator is the length of the tail, that is to say, its distance from the main surfaces measured between centres of pressure. A long tail is indicated as advantageous, but it will be noticed that the factor, I , for moment of inertia appears in denominator, where it contributes to instability, so that in making the tail long it is necessary to guard against increasing the moment of inertia. In fact the designer might consider it advisable to have a short tail for this reason.

If the tail is discarded altogether, the expression becomes zero, and automatic stability vanishes under the conditions of the hypothesis. These do not, it should hardly be necessary to point out, include provision for the hand manipulation of an elevator, so that when Mr. Lanchester says that the Wright flyer is unstable, he is not attempting to dispute the fact that it flies, as some few people appear to imagine. Admittedly the investigation

is very incomplete from a practical point of view, but if it leads someone a step further along the right path it will have done as much as the majority of works are capable of doing for mankind.

Langley v. Lanchester.

There could be no better example of the desirability of definitely establishing the theoretical groundwork of the science of flight once and for all than that illustrated by the point brought forward in a correspondent's letter this week. Mr. Nyborg raises the subject of Langley's experiments on skin-friction, and takes the point of view, which is occasionally put forward, that Langley did not really say, or, at any rate, mean to imply, that skin-friction is negligible in practice. The question as to what Langley really meant is of a character likely to result in unsatisfactory argument. But that there is at least justification for assuming that he really did mean that skin-friction is negligible, and that the power required reduces with velocity, is shown by the following quotation, taken from page 34 of the second edition of his Memoir:—

"The results of these two series of experiments furnish all that is needed to completely elucidate the proposition that I first illustrated by the suspended plane, namely, that the effort required to support a bird or flying machine in the air is greatest when it is at rest relatively to the air, and diminishes with the horizontal speed which it attains, and to demonstrate and illustrate the truth of the important statement that *in actual horizontal flight it costs absolutely less power to maintain a high velocity than a low one.*"

This is a quotation which Mr. Lanchester makes in his "Aerodynamics," page 355, and is one of those upon which he bases his assumption of Langley's point of view. Anyone reading the above quotation must at least admit that its interpretation hardly leaves any other alternative. The quotations given by Mr. Nyborg in his letter are emphasised by him on the sentence "within the limits of experiment," but it is significant that Langley himself in the first of the quotations selected by Mr. Nyborg italicises the subsequent words, which read "*in such aerial horizontal transport the higher speeds are more economical of power than the lower ones.*"

What Langley meant.

The real significance of the second quotation given in Mr. Nyborg's letter is, we think, rather spoiled by the omission of the latter part of the paragraph from which it is taken. This reads:

"It has not been thought necessary to present any evidence that an engine or other adjunct which might be applied to give these planes motion, need itself oppose no other than frictional resistance, if enclosed in a streamlike form, since the fact that such forms oppose no other resistance whatever to fluid motion has been abundantly demonstrated by Froude, Rankin, and others."

It appears to us that the statement quoted above gives the clue to the real significance of the proviso "within the limits of experiment" which is italicised by Mr. Nyborg in his letter. Langley apparently introduced the term merely in order to guard himself against having his deductions applied to forms other than planes, but that he really believed skin-friction was negligible so far as the supporting surfaces of a real flying machine are concerned we do not think there is very much doubt.

The Law of Skin-Friction.

In Lanchester's hypothesis it is, as we have shown above, only the supporting surfaces by themselves which are considered, so that the difference between the two points of view remains of a very vital character. Langley, on the one hand, came to the conclusion that an aerofoil, representing a given weight, would absorb less absolute power for propulsion the faster it is designed to fly, while

Lanchester comes to a totally different conclusion. The difference splits entirely as to whether the skin-friction is or is not negligible. If it is negligible, then it must be negligible at all speeds; but if, on the other hand, it is not negligible, then, however small the value may be at low speeds, it will assume more and more relative importance as the speed gets faster. The fact that skin-friction between solids and fluids increases for all practical purposes as V^2 is one which Langley himself presumably accepted, judging by his reference to the experiments of Froude and Rankin in the above quotation, only he apparently believed that planes possessed special properties placing them outside the realm of skin-friction altogether.

The Aerodynamic Resistance in Flight.

So far as the aerodynamic resistance is concerned, Langley and Lanchester are in entire accord: the theory of the reduction of the aerodynamic resistance as the speed of flight increases is dealt with in the paragraph under that heading on page 293 of FLIGHT, May 22. This law is graphically represented by the curve, y , in the first of the diagrams on page 294 of the same issue, and that curve by itself may be taken as representing Langley's view of the situation. Lanchester, however, introduces skin-friction, x , as a factor to be taken note of. It is immaterial how small the skin-friction may be at any particular speed; the fact remains that if it is to be taken note of at all it must be superimposed upon the graph just mentioned by a curve of opposite slope, x , such that skin-friction resistance varies as V^2 .

A Simple Point in Graphics.

Now if any two curves of opposite slope have to be taken collectively, there will obviously be some point at which their sum is a minimum, and equally obviously that point will be where those two curves intersect one another. This fact, it will be noticed, is absolutely unaffected by any other consideration whatever than that the curves shall slope opposite ways. Any two imaginary values may be taken as simultaneously representing skin-friction and aerodynamic resistance respectively, and either or both may be made as small as we please, yet if they are not equal to one another (that is to say, represented by the same point on the graph), then they do not represent the minimum total resistance of a system which obeys the direct and the inverse square laws as explained above.

Conclusion.

It is apt to be a little difficult to make the real significance of this fact quite clear, because it seems totally unreasonable to suggest that there is any advantage in having more skin-friction than the absolute minimum possible. It must be remembered, however, that the hypothesis is that of a plane or aerofoil having a certain definite weight which must be supported in flight. The weight is not present as a separate mass which would introduce resistances of its own, but is present in the aerofoil itself. It has been established that the faster an aerofoil flies, the greater will be the load for a given area, or conversely the less the area necessary to sustain a given weight. It is because of this reduction in area that the aerodynamic resistance decreases with velocity, and Langley's theory applied to this problem is merely another way of saying that it pays to use the smallest possible surface which will support the weight. Lanchester's point of view, however, is that the extremely high speed necessary with such a small surface would

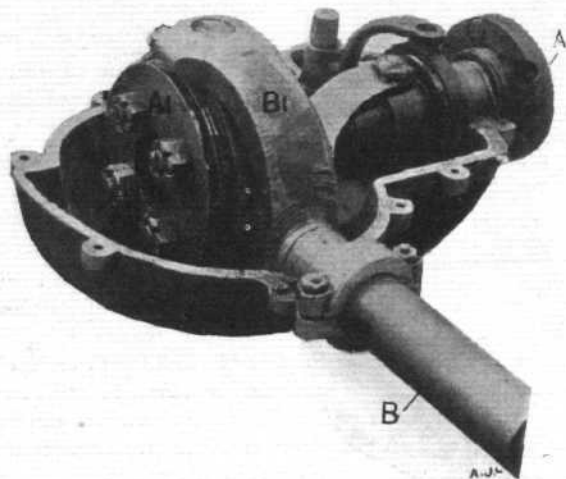
make the skin-friction resistance so large that it might pay to have a larger surface and travel slower; in fact, arguing solely from the point of view of skin-friction considered by itself, it would be best to have the largest possible surface and the least possible velocity. It would

be seen, therefore, that the two resistances automatically react on one another, and it is by the aid of the two curves x and y in the aforementioned diagram that it can be shown that the minimum total resistance obtains when they are equal to one another.

GEARS FOR FLAPPING FLIGHT.

THE COCHRANE GEAR.

A VERY simple and ingenious gear for the conversion of rotary motion into oscillating motion was exhibited by Mr. Cochrane at the Olympia Aero Show. The

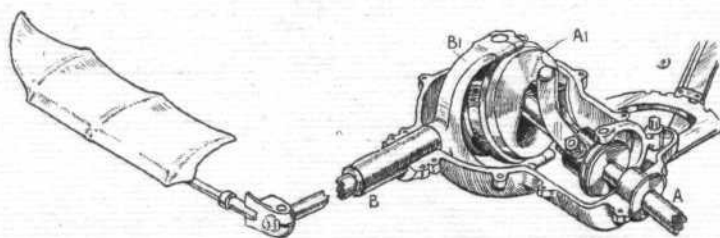


"Flight" Copyright Photo.

View showing the Cochrane Gear in its neutral position.

object of the device in its association with flight is mainly to facilitate the flapping of wings, but it is interesting to note that it was originally designed for use in connection with the propulsion of motor boats by means of a feathering paddle.

Simplicity is the keynote of the construction, which consists essentially of three members: the driving-shaft,



"Flight" Copyright.

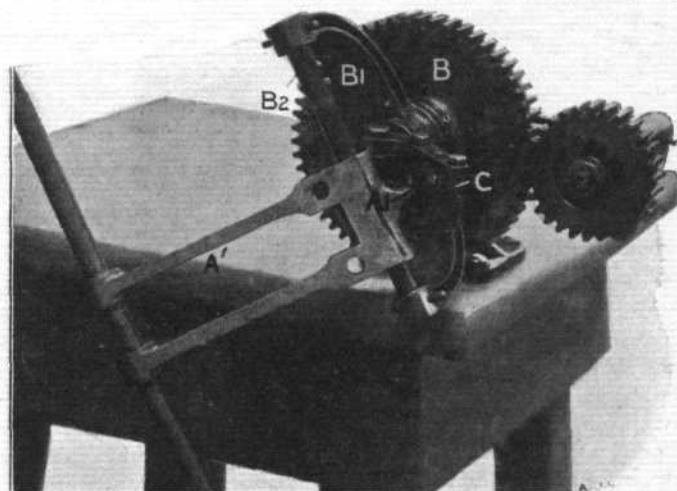
By the use of a disc, A^1 , pivoted to the rotary driving-shaft, A , the Cochrane Gear beats the wing on the shaft, B , up and down.

A , which rotates; the oscillating-shaft, B , at right angles to it; and a connecting member in the form of a disc, A^1 , pivoted to the driving-shaft and having a grooved edge with which the forked end of the oscillating-shaft engages. This disc, when lying obliquely to its shaft, traverses a path which causes an oscillating motion to be imparted to the fork, and as the obliquity of the disc determines the amplitude or "stroke" of the oscillation, it is merely necessary to contrive a simple mechanism for setting the disc in order to obtain a variable gear. This is accomplished by the use of a link and sliding-sleeve, controlled by a hand lever working on a notched quadrant, which gives a series of "speeds" from zero to a maximum.

The constructive details are well illustrated by the accompanying sketch and photograph, of which the sketch shows the disc in its working position, while the photograph illustrates the zero position, when the disc, being at right angles to the shaft, imparts no motion to the fork. The Cochrane gear does not include any mechanism for feathering the wings on the up stroke.

THE DE LA HAULT GEAR.

On the De la Hault aeroplane, which was the only full-sized machine of the flapping-wing class exhibited at the Olympia Show, the most important feature of the



"Flight" Copyright Photo.

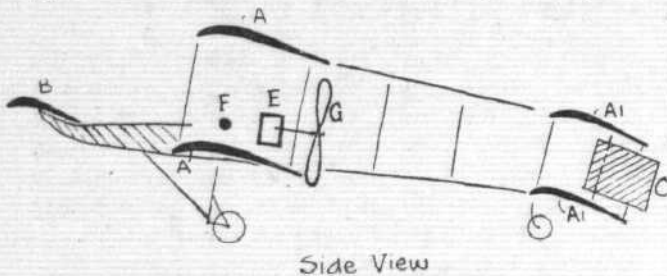
In the de la Hault Gear the paddle on the arm, A , is feathered during its up stroke by the presence of the stationary ball-socket-joint, C , acting in conjunction with the rotating pivot-pin, B^2 .

gear is the mechanism by which a feathering movement is imparted to the paddles. Each paddle is attached to an arm, A , which is hinged, but free to slide, on a pivot-pin, B^2 , carried by a rotating fork, B^1 , attached to a gear-wheel, B . An extension of the arm, A , terminates in a ball, A^1 , which engages with a socket formed in the face of a small crank, C , which is itself hinged to a fixed shaft. The crank cannot revolve, the hinge being merely to allow for slight axial movements, and the ball-socket-joint thus forms a stationary abutment for the reaction of the paddle. Its position in respect to the rotating fork, B^1 , is such that a very peculiar motion is imparted to the paddle as the result of the revolution of the gear. In the position illustrated, the blade of the paddle is feathered, and assuming the big gear-wheel to be rotating clockwise, the paddle is about to be swung up into a vertical position. By the time that the pivot-pin lies horizontally the paddle will be ready to commence its downward beat upon the air, which in turn will be followed by the feathering action. Watching the gear in action gives the impression that the part of the feathering stroke is a rowing stroke, but any propulsive effect which might result from this is neutralised by a similar action in the reverse sense at the termination of the upward movement.

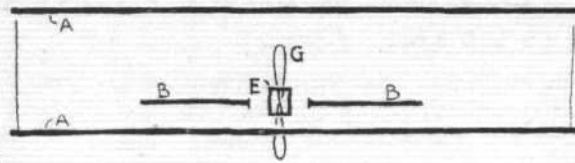
TYPES OF FLYERS AND SOME SKETCHES OF LEADING MODELS.

Nor the least interesting aspect of the Aero Show at Olympia was the very variety of the different aeroplane types that were shown. So diverse, indeed, were the

machine design. Even with cars, however, the present most popular type was not accepted without question, and still there are not wanting adherents of other



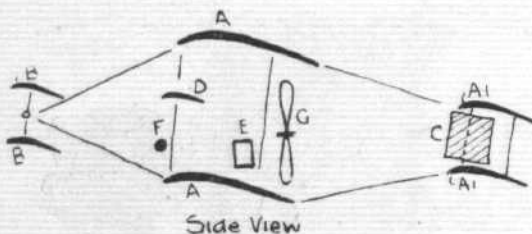
Side View



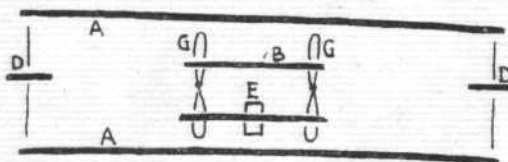
Front View

"Flight" Copyright.

The Voisin type of biplane is characterised by the use of a tail which is carried at the extremity of an outrigger framework extending some distance to the rear of the machine. The tail is for the purpose of maintaining longitudinal stability.



Side View



Front View

"Flight" Copyright.

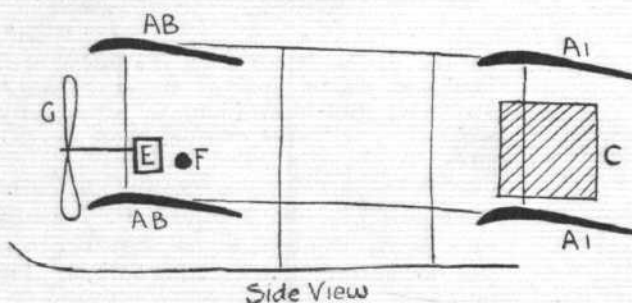
The Pischhoff biplane is a tailed machine, and as such therefore belongs to the Voisin type, but it differs from the typical Voisin flyer both in appearance and construction. Its tail is not quite as far to the rear, and has a different normal level.

even the principle of using four wheels has been assailed, for did not Duryea once produce a three-wheeled runabout, and has not the use of six wheels on larger vehicles received very serious consideration in France? It is hardly to be expected, therefore, that the flying machine should be a settled type just yet, and, indeed, in the aeroplane class alone there is sure to be a considerable difference of opinion as to the best general arrangement.

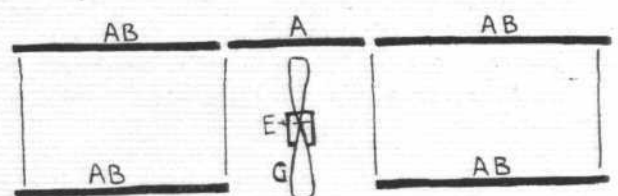
machines on view that even casual visitors might be heard to remark that "designers didn't seem to have any very settled notion just yet as to what a flyer ought to look like." Therein they were but expressing an obvious truth, even though the implied taunt has little if any justification. At the present time designers have not got "settled notions" on the matter. But at the same time it would be a very bad thing for the future of the movement if they had.

It is only by trying every plan that has a semblance of feasibility that an ultimate selection of the best type will come to be made for any particular purpose. Motor cars had to be evolved in the same way, although in that case there was, perhaps, less scope for such extreme individuality as finds expression in flying

A glance at the accompanying sketches is instructive as showing how some of these machines vary at the present day. They represent the aeroplanes which were



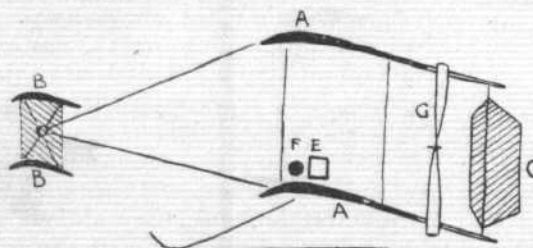
Side View



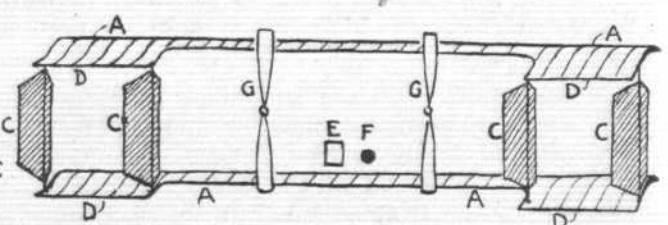
Front View.

"Flight" Copyright.

On the Breguet machine the main planes are pivoted to serve the purpose of an elevator, the tail is exceptionally large, and the propeller is placed in front, which is an unusual position on biplanes.



Side View



Rear View

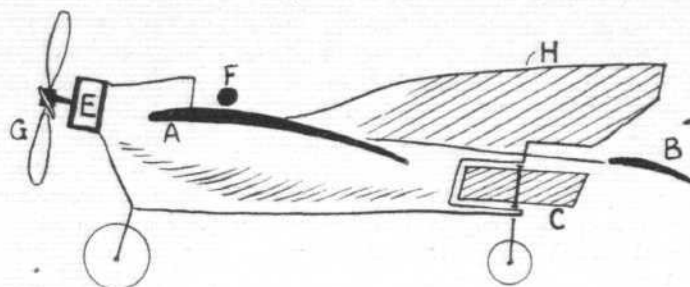
"Flight" Copyright.

The Short biplane, like the Wright flyer, is a tailless machine, and it represents a type of its own in having no outrigger framework for carrying the rudder.

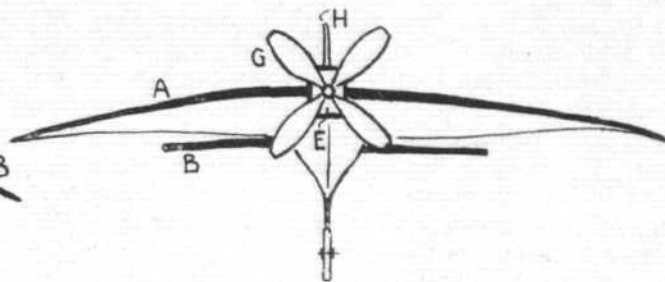
on view at Olympia, and while they have not been drawn to scale, they have, nevertheless, been designed to convey a correct idea of the essential characteristics of the

machines they portray. We do not purpose entering into any detailed account of minute details of construction in this article, wherein we are merely seeking to point out a few leading facts of general interest relating

adopted for experimental work, the outrigger which carries the tail would seem to be a drawback, for the Wright flyer itself has once or twice been damaged at the start through a collision between this part of the frame,



Side View



Front View

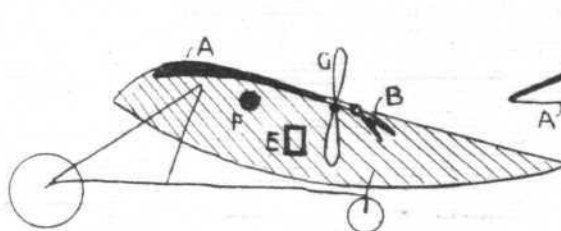
"Flight" Copyright.

Great care is taken in the construction of the Rep monoplane to cover every inch of the exterior with surface fabric. Its large keel down the middle of the back is a characteristic feature of this flyer.

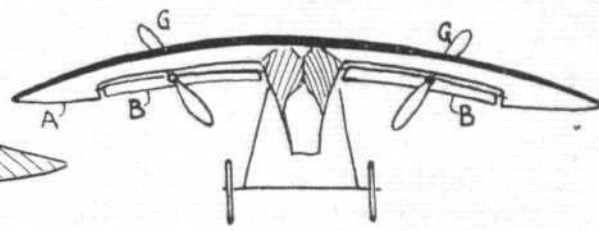
to those different examples of the various types which readers have already had an opportunity of seeing for themselves.

Tail or No Tail.

Taking first into consideration the biplanes as a class by themselves, the leading question to be decided appears to be that of "tail or no tail." By a tail is implied any supplementary supporting surface or surfaces carried on an outrigger framework behind the main planes. Usually, as in the case of the Voisin flyers, such a tail takes the form of a box-kite, but the presence of the side-curtains between the horizontal surfaces is not invariable, the Pischoff flyer being an instance of a simple biplane tail, and the Breguet flyer being an example of a machine having an extremely large tail, also without side-curtains. The Short flyer was the only example at Olympia of a biplane without a tail, in which respect it belongs to the same category as the famous Wright machine.



Side View



Front View

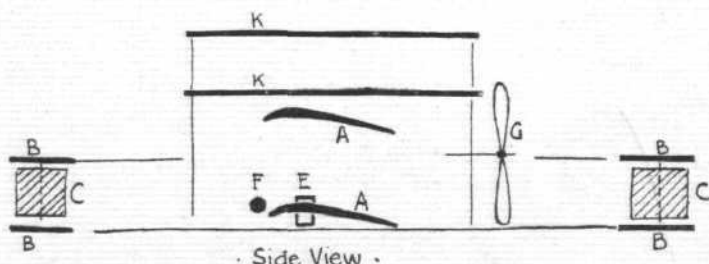
"Flight" Copyright.

The Weiss Flyer, like most monoplanes, has arched wings, and somewhat resembles a bird in appearance. An unusual detail is the use of two propellers.

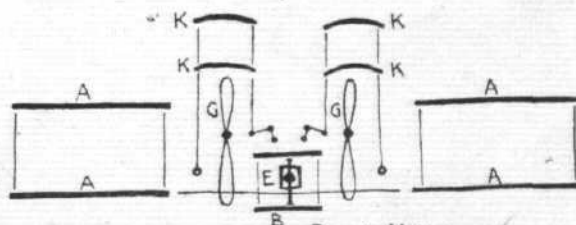
which only carries a rudder, and the rail after the main-planes had left the track.

Monoplanes v. Biplanes.

Although monoplanes had distinct superiority in numbers over biplanes at the Paris Aero Salon, the reverse was the case at Olympia, where out of a total of eleven full-sized exhibits, seven represented the latter principle. There were, in fact, only two monoplanes on view, and of these the R.E.P. alone represented a type which had flown, although some very satisfactory glides



Side View



Front View

"Flight" Copyright.

The Lamplough machine has been designed to lift itself direct from the ground by the aid of waving aeroplanes. It has stationary aeroplanes for gliding.

The primary object of a tail is to maintain automatic longitudinal stability, and thereby make it easier for the pilot to keep control over his machine. Experiments, so far as they have gone, seem to show that a tail actually does perform this purpose, but there is at the same time some reason to question whether it has not disadvantages of its own, among which a sluggish effect, especially when starting, is that most commonly cited. If a starting rail, such as is used by the Wrights, comes to be generally

have been accomplished with the Weiss. The relative advantages of the two types are in brief already known to our readers, and in the absence of more conclusive experiments it is impossible to enlarge upon the subject. M. Pelterie adopted the monoplane principle after experimenting with gliders of the Wright biplane type, because he considered that the numerous wires necessary in the construction of the framework of the latter offered a disproportionate amount of resistance to the wind,

owing, he thought, to their perpetual state of vibration. A monoplane, however, has, of course, roughly speaking, only half the surface for a given span, and consequently it must go faster to achieve the same lift. Later on, when the art of flying becomes a little more general and better understood, high speed will doubtless be looked upon as an advantage as it is in a motor car, but with the present difficulties in connection with rising off the ground, it needs an unusually intrepid pilot to carry out satisfactory experiments on these lines, so that although there is a distinct fascination about the neatness and clean cut of the machine as a type, its limitations in connection with slow speed tend to militate against its popularity at the present time. In France, the Bleriot and Antoinette monoplanes are also both doing good work, as our readers know, and there is every prospect of interesting developments ensuing with machines such as these; we trust that an opportunity may be found for trying the monoplane properly in England.

Rising Direct.

The problem of getting direct off the ground without any preliminary run is one that appears to have a stronger

fascination to a large number of people than that of actual flight itself, and it is, of course, a very important matter. At Olympia the Lamplough machine was an interesting example of an attempt to solve the problem by means of mechanically-operated aeroplanes arranged to wave to and fro through the air in such a manner as to exert a direct lifting effect on the machine. What may be the ultimate nature of the solution of the lifting problem is by no means certain at the present time, but it has been suggested that even the ordinary biplane might be made to lift itself straight up into the air solely as the result of the induced draught from its propellers, if the draught were created at sufficient velocity and in such a manner as to affect an adequate area.

Table of Reference Letters on the Sketches of Aeroplane Types.

A	Main-planes.	E	Engine.
A'	Tail.	F	Pilot's seat.
B	Elevator.	G	Propeller.
C	Rudder.	H	Keel.
D	Stability-planes.	K	Lifting-planes.

Gold Medal for British Inventors.

WITH a view to encouraging British invention, the Aerial League are offering a gold medal for the most promising model of an airship or aeroplane by a British subject exhibited at the Travel Exhibition at Olympia.

£5,000 in a Week.

ALTHOUGH it was only founded on Monday week, the Aerial League of Gotha, in Germany, has collected £5,000 in a week towards the cost of a dock for airships which it is proposed to construct near Gotha.

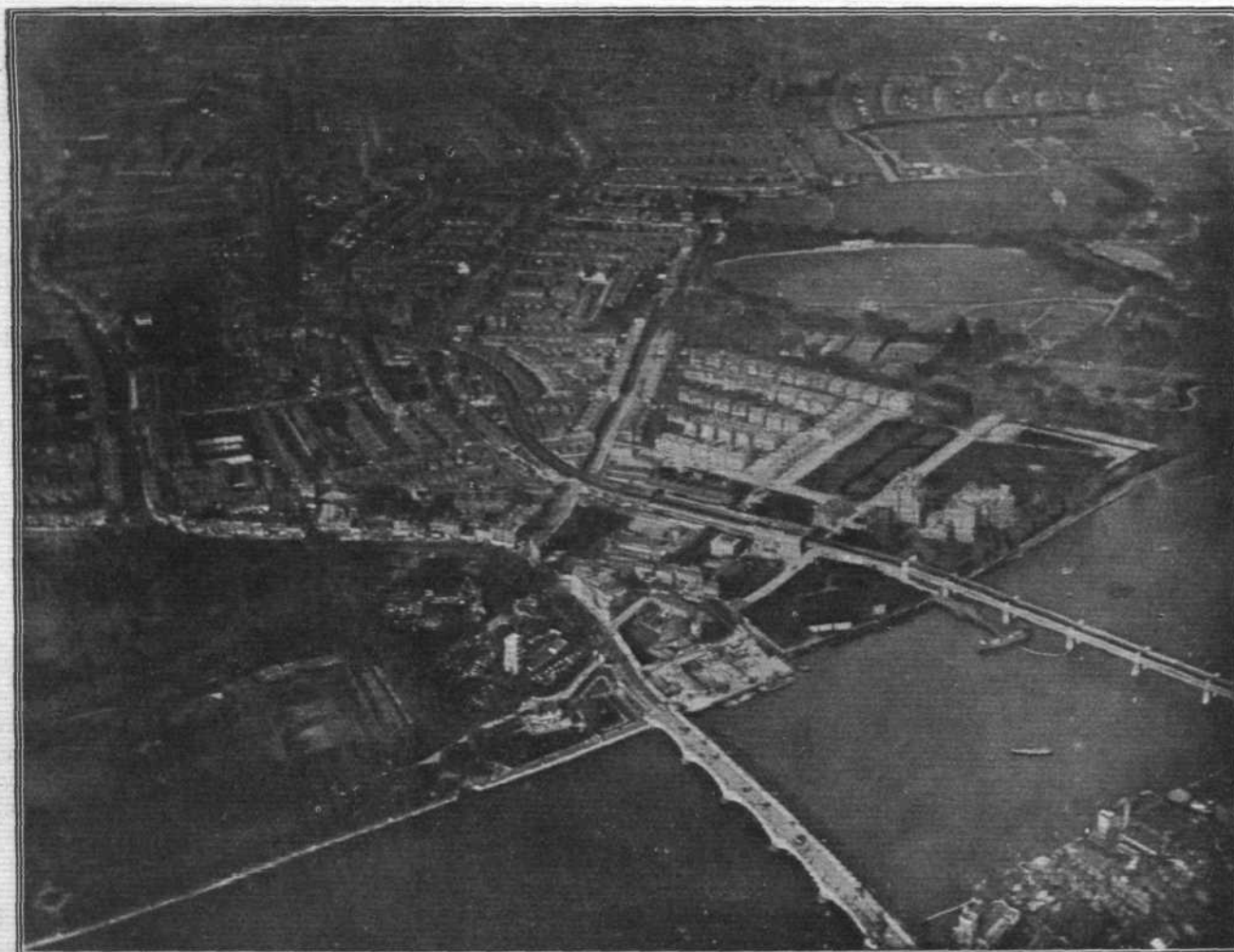


Photo by Dr. W. J. S. Lockyer.

Putney railway and road bridges, viewed from the "Corona" balloon on June 29th, 1908, at an altitude of 1,550 ft.

AERO CLUB OF THE UNITED KINGDOM.

OFFICIAL NOTICES TO MEMBERS.

Fixtures for 1909.

June 26	... Sailor-Aeronaut Race, "Enchantress," Netley, Southampton.
July 10	... Balloon Race, Hurlingham Club (Challenge Cup presented by Mr. F. Hedges Butler).
July 17	... "Hare and Hounds" Balloon Race, Hurlingham Club (Cup presented by the Hon. C. S. Rolls).
August 28	... Gordon-Bennett Aviation Cup, Rheims.
October 10	... Gordon-Bennett Balloon Race, Zurich.

Point-to-Point Race, June 12th.

Owing to the bad weather on Saturday last, the Point-to-Point Race for the Cup presented by Mrs. Assheton Harbord was cancelled.

Mr. G. B. Cockburn at Chalons.

Mr. G. B. Cockburn, a member of the Aero Club, who has recently acquired a Farman machine, made his first flight at Chalons on Monday last. He covered a distance of 500 yards at a height of about 12 ft. Owing to a defect in the steering gear, he was obliged to cut off the engine, and descending rapidly, caused a slight breakage. Mr. Cockburn hopes to resume his trials in the course of a few days.

Models at the Travel Exhibition.

A Model Section is being organised at the Travel Exhibition to be held at Olympia in July next, and the Aerial League of the British Empire will present gold, silver and bronze medals for the best working flying models, whether of the heavier-than-air or lighter-than-air type. The competition is open to British subjects, and in awarding the medals, general excellence and not necessarily the longest flight will be taken into consideration. Exhibitors are requested to notify the Secretary of the Aero Club if they wish to compete.

Cross-Channel Flights.

Mr. A. Ogilvie and Mr. T. P. Searight, members of the Aero Club, have acquired flying grounds at Camber, near Rye, and have erected a shed in anticipation of their Wright machine which is now being built by Messrs. Short Bros., at Shellbeach. Camber is situated within reasonable distance of the narrowest part of the Channel, and the foreshore directly in front is very broad and the surface sand very hard, giving one mile by two and a half miles at low water. Messrs. Ogilvie and Searight have kindly placed the ground and shed at the disposal of the Aero Club for any of the members who may at any time contemplate a cross-channel flight.

Sailor-Aeronaut Race.

An invitation has been received from the Motor Yacht Club, whose headquarters are at the yacht "Enchantress," anchored of Netley Hospital, to the members of the Aero Club to compete in a Sailing Race on Saturday, June 26th, 1909.

The start will be made from the "Enchantress," and the 18 ft. one design sailing boats belonging to the Motor Yacht Club will be used for the race.

First prize and souvenir to crew, value £10. Presented by Mrs. Griffith Brewer.

Second prize and souvenir to crew, value £5. Presented by Mr. Frank H. Butler.

Members of the Motor Yacht Club and the Aero Club will be eligible to compete, subject to the following qualifications:—

1. Those who are members of both Clubs, *i.e.*, of the Motor Yacht Club and of the Aero Club.

2. Members of either Club who have made at least one ascent in a balloon or aeroplane.

3. Ladies, whether members of either Club and who have made at least one ascent in a balloon or aeroplane.

Members of the Aero Club will be honorary members of the Motor Yacht Club during their visit to the "Enchantress."

Entries are to be sent to Col. W. A. Jupp, secretary, Motor Yacht Club, "Enchantress," Netley Abbey; or Harold E. Perrin, secretary, Aero Club, 166, Piccadilly, London, W. Entries close at noon on the day of the race.

A train leaves Waterloo at 10.15 a.m. on Saturday, June 26th, arriving Southampton West at 11.53. The Club motor launches will leave the Town Quay at 12 o'clock and 12.45, bringing visitors and members to the "Enchantress" in time for lunch.

The one design sailing boats have a length of 18 ft., beam 5 ft. 9 in., depth 2 ft. 9 in., sail area 202 sq. ft.

"Daily Mail" Flight Prizes.

The proprietors of the *Daily Mail*, in consultation with the Aero Club of the United Kingdom, have drawn up a complete set of rules which are to govern all attempts to win the various *Daily Mail* flying prizes. The rules will be found in full on page 364.

Shellbeach Flying Ground.

Erection of Sheds.—Members wishing to erect their own sheds at Shellbeach are requested to apply to the Secretary, who will supply all information.

Sleeping Accommodation at Shellbeach.—In order that the Committee may have some idea of the demand for sleeping accommodation at Shellbeach during the ensuing season, Members who are likely to require such accommodation are requested to notify the Secretary of the Aero Club forthwith. It is not necessary to specify any particular date at present, the object of this notice merely being to ascertain the probable demand for rooms.

Golf Course at Shellbeach.—The Committee of the Aero Club have under consideration the advisability of acquiring the golf course which immediately adjoins the flying ground at Shellbeach. Golfing members are therefore requested to notify the Secretary at once if they are likely to make use of the course, so that the Committee may have some idea as to what support will be forthcoming.

Railway Arrangements.—The following reduced fares have been arranged with the railway company for members visiting Shellbeach:—

1st Class Return	2nd Class Return	3rd Class Return
8s.	6s. 6d.	5s.

These tickets will be available for one month from date of issue. Members desiring to avail themselves of these reduced fares are required to produce vouchers at the booking offices. Vouchers can be obtained from the Secretary of the Aero Club. Trains leave Victoria, Holborn, or St. Paul's.

For the convenience of members, the best train is the 9.45 a.m. from Victoria, arriving at Queenborough 10.55. At Queenborough change to the Sheppey Light Railway for Leysdown (Shellbeach), which is $\frac{3}{4}$ mile from the flying ground.

The Club House, Muscle Manor, is now open to members, and refreshments can be obtained there. Until the ground is being regularly used it is, however, advisable to send a telegram so that arrangements may be made. Telegrams should be addressed "Aero Club, Shellbeach, Eastchurch."

Members proposing to visit the Aero Club flying ground at Shellbeach are reminded that access to the aeroplane sheds or works can only be obtained with the consent of the owners of the flying machines.

"DAILY MAIL"

IN view of the great advances which have been made recently and the likelihood of serious attempts being made in the near future to win the valuable prizes which have been so generously offered by the proprietors of the *Daily Mail*, it is timely that the definite rules which are to govern the attempts should be finally decided upon. They have been drawn up in consultation with the Aero Club of the United Kingdom, and they are now published in full below. At present the *Daily Mail* prizes number three, £1,000 for a flight across the English Channel, £1,000 for a flight for one mile by a British subject in the British Isles, £10,000 for a flight from London to Manchester or *vice versa*.

The details are as follows:—

THE "DAILY MAIL" CROSS-CHANNEL FLIGHT.

Under the Rules of the International Aeronautical Federation.

The proprietors of the *Daily Mail* hereby undertake to pay the sum of £1,000 (one thousand pounds) to the first person who shall satisfy them that he has succeeded in flying across the Channel from a point on English soil to a point on French soil or *vice versa*.

1. The whole flight to be made between the hours of sunrise and sunset.

2. No part of the machine shall touch the sea during the flight.

3. The flight shall be accomplished by means of a machine which is not in any manner supported by a gas lighter than air.

4. Entries for the competitions can be made at any date during 1909 by giving not less than forty-eight hours' notice to the editor of the *Daily Mail* either at Carmelite House, London, E.C., or at the office of the Continental *Daily Mail*, Paris.

5. In every case notification of the first attempt to be made under these conditions shall reach the editor of the *Daily Mail* not less than forty-eight hours prior to such attempt, and in the case of all subsequent attempts not less than twenty-four hours' notification shall be given.

6. The entrant must furnish satisfactory evidence of previous flights before making any attempt under these conditions.

7. The entrant must supply satisfactory signed evidence of the exact points of departure and arrival.

8. In accordance with the rules of the International Aeronautical Federation the entrant must be a member of, or obtain a permit from, the recognised body of the Federation.

9. Should any questions arise at any time after the date of entry as to whether a competitor has properly fulfilled the above conditions, or should any other question arise in relation to them, the decision of the Committee of the Aero Club, in conjunction with the editor of the *Daily Mail*, shall be final.

10. Each competitor agrees to waive all claim for injury either to himself or to his apparatus, and agrees to assume all liabilities for damage to third parties or their property, and to indemnify the proprietors of the *Daily Mail* and Aero Club against any such claims.

£1,000 FOR A ONE-MILE FLIGHT.

Under the Rules of the International Aeronautical Federation.

1. The flight shall be accomplished by means of a machine which is not in any manner supported by a gas lighter than air.

2. The complete machine—i.e., the motor, planes, propellers, and all other parts thereof—shall have been entirely constructed within the confines of the British Empire by British subjects. This shall not be held to apply to raw material.

3. The inventor or inventors and the entrant, who must be the person operating the machine, shall be British subjects at the date of entry.

Hurlingham Club and the Aero Club.

Members of the Aero Club may be elected Associate Members of the Hurlingham Club on very favourable terms. Full particulars can be obtained on application to the Secretary of the Aero Club.

HAROLD E. PERRIN, Secretary.

The Aero Club of the United Kingdom,
166, Piccadilly, W.

FLIGHT PRIZES.

4. The distance to be traversed shall be not less than 1 mile on a course round a mark half a mile distant from a prescribed starting line, and returning to the starting line, which will be defined by two posts. No part of the machine shall touch the ground during the flight.

5. The flight shall take place within the British Isles in the presence of official observers appointed by the Aero Club in conjunction with the *Daily Mail*.

6. Formal notice of entry shall be sent to the editor of the *Daily Mail* not less than one week before the proposed flight.

7. In every case notification of the first attempt to be made under these conditions shall reach the editor of the *Daily Mail* not less than forty-eight hours prior to such attempt, and in the case of all subsequent attempts not less than twenty-four hours' notification shall be given.

8. The flight shall take place not later than the 30th June, 1910.

9. In accordance with the rules of the International Aeronautical Federation, the entrant must be a member of, or obtain a permit from, the recognised body of the Federation.

10. Should any question arise at any time after the date of entry as to whether a competitor has properly fulfilled the above conditions, or should any other question arise in relation to them, the decision of the Committee of the Aero Club, in conjunction with the Editor of the *Daily Mail*, shall be final and without appeal.

11. Each competitor agrees to waive all claim for injury either to himself or to his apparatus, and agrees to assume all liabilities for damage to third parties or their property, and to indemnify the proprietors of the *Daily Mail* and the Aero Club against any such claims.

£10,000 PRIZE: LONDON TO MANCHESTER.

Under the Rules of the International Aeronautical Federation.

1. The flight may commence from any spot selected by the competitor, but the machine must during the course of the flight pass within a radius of five miles of the London and Manchester offices respectively of the *Daily Mail*.

2. The flight shall be made within one day of twenty-four hours, and the competitor shall be entitled to not more than two stoppages in the course of the flight.

3. The flight shall be accomplished by means of a machine which is not in any manner supported by a gas lighter than air.

4. Formal notice of entry shall be sent to the editor of the *Daily Mail* not less than one week before the proposed flight.

5. In every case notification of the first attempt to be made under these conditions shall reach the editor of the *Daily Mail* not less than forty-eight hours prior to such attempt, and in the case of all subsequent attempts not less than twenty-four hours' notification shall be given.

6. The flight shall be commenced in the presence of official observers appointed by the Aero Club in conjunction with the *Daily Mail*.

7. In each case the starting point shall be arranged after notice of entry, and no competitor shall be entitled to the prize unless the persons mentioned in Condition 6 shall have been present to witness the commencement of the flight.

8. In accordance with the rules of the International Aeronautical Federation the entrant must be a member of, or obtain a permit from, the recognised body of the Federation.

9. Should any questions arise at any time after the date of entry as to whether a competitor has properly fulfilled the above conditions, or should any other question arise in relation to them, the decision of the Committee of the Aero Club, in conjunction with the editor of the *Daily Mail*, shall be final.

10. Each competitor agrees to waive all claim for injury either to himself or to his apparatus, and agrees to assume all liabilities for damage to third parties or their property, and to indemnify the proprietors of the *Daily Mail* and the Aero Club against any claims.

BALLOON PHOTOGRAPHY.

PHOTOGRAPHY is to most people a fascinating hobby at all times, but to those who have the opportunity to practise the art when suspended in "the central blue" it is doubly so, for they enjoy an advantage in being able to avail themselves of a new view-point, a thing dear to the heart of the amateur photographer. Elsewhere in this issue we are able to reproduce the first of a splendid and unique series of photographs which were secured

last year by Dr. W. J. S. Lockyer during his balloon trips, and which recently were awarded the first prize in the Aero Club's competition for the best set of photographs taken from a balloon. They are peculiarly interesting, and doubtless those of our readers who know the places depicted will experience pleasure in seeing what they look like from up aloft. One forms the frontispiece this week, and another appears on page 362.

NAVAL DEFENCE AGAINST AIRSHIPS.

REPLYING to Mr. Wedgewood in the House of Commons on Wednesday, Mr. McKenna, First Lord of the Admiralty, said that the design of mountings for guns to render them capable of firing at such

an elevation as to be used against dirigibles had been commenced. Should future experience show their use to be desirable, they would be supplied to warships.

ROYALTY AT THE UNITED SERVICES COLLEGE.

ON Saturday last, T.S.H. Prince and Princess Alexander of Teck paid a visit to the United Services College at Windsor to distribute the prizes. Prince Alexander referred to the fact that the school was one of the first to take up the study of flight, which they were

enabled to do by the splendid laboratory which had been presented for the purpose by Mr. Patrick Alexander. He was glad to say the President of the College, Prince Christian, was much better, and hoped to pay a private visit to the College before long.

SIR HIRAM MAXIM AND FLYING INVENTORS.

PRESIDING at the first lecture of a series on aeronautics by Mr. G. P. Thurston, at the East London Technical College, on Monday night, Sir Hiram Maxim gave several reminiscences of his experiments with heavier-than-air machines, and a story was told showing how he dealt with inventors of flying machines. He offered to give £50,000 for a successful flying machine, and was inundated with letters from all kinds of people saying that they were entitled to the money. To all he had one reply: "I am glad to hear you have a successful flying machine. Fly round with it to my house in the morning, and we will fly together to the bank to get the money."

Needless to say, he never had to pay. Sir Hiram also said he was still working at the problem, and

was not ashamed now to admit it. There had been, however, a time when anyone who took an active interest in the problem of human flight had to hang their heads, for the subject was looked upon, until but a short time back, as one to be classed with those of the philosopher's stone or perpetual motion.

Mr. Thurston's lecture was devoted to machines of the heavier-than-air type. He described the various machines which have been built from the time of Besmier to the present, the differences between them being illustrated by means of lantern slides, diagrams, and models. The second lecture, on "Balloons, Airships, and Kites," will be held on the 23rd inst., and the third and last lecture, on "The Mechanical Principles of Flight," on the 30th inst.

STILL ENTHUSIASTIC AFTER FALL OF 3,500 FEET.

THE demands of aviation have called into prominence a series of men who are remarkable for their cool daring and determination in achieving their object, but surely the high-water mark has been reached by a blacksmith hailing from Berwyn, a little town in the United States. Doubtless inspired by his high-sounding patronymic—Ulysses Lorenson—he has an ambition to achieve something out of the ordinary run of common life. The subject of flight attracted his attention and during his spare time he has been engaged in building an aeroplane.

In order to try it he was taken up to a height of 3,500 ft. by a balloon and then set free. Unfortunately, the apparatus refused to work, and the machine rolled over and over, and it looked as though the daring experimenter was doomed to an awful death. Just before the earth was reached, however, the wings of the flyer spread out and somewhat retarded the fall. Needless to say, the aeroplane was smashed, but the aviator sustained nothing worse than a large number of bruises.

According to the *Daily Telegraph*, on recovering consciousness, half an hour afterwards, this modern Mark Tapley gave the following account of the accident and his feelings:—

"I'm all right, and my aeroplane is all right, and, what's more, that blamed thing is going to fly, and solve the problem of flying. Just as soon as this soreness wears off, I'll begin work on another one. I have already ordered the material, and I'll be all right in a couple of days. You see, the rudder got jammed, and refused to keep the aeroplane in a horizontal position. We tipped forward, and then we turned over. After that we just kept on turning over until I thought we were spinning around like a top going sideways. I can't imagine how the rudder happened to jam. I am positive the thing will fly if given half a chance.

"Why didn't I fall out? I didn't have time to fall. That aeroplane was falling just as fast as I was, and, anyway, I was braced in. We went down like a streak of lightning, it seemed to me, and yet I was sure I was falling for at least a month. I didn't once think of being killed. In fact, I never thought what would happen when I hit the ground. All I thought was to get that lever and rudder working. Yes, I'm sore, but I'm more sore at that rudder than anything else. In my next machine I'll make no mistake, and it will fly all right."

NEWS OF THE WEEK.

Three Men in an Aeroplane.

M. BLERIOT has once again placed a milestone on the rapidly growing road of aeronautical progress by being the first to achieve free flight on a heavier-than-air flying machine with two passengers beside himself on board. The two who made the trip with M. Bleriot on his monoplane "No. XII," were M. Santos Dumont and M. A. Fournier, the total weight which the 22 square metres were called upon to sustain being in the neighbourhood of 565 kilogs. The flight, which was made at Issy on Saturday afternoon last, was not a very lengthy one, only extending to about 300 metres in a straight line, and it was followed by another of similar duration. A little later M. Bleriot carried his *mecanicien* for a couple of turns round the Issy Parade Ground, a distance of about 6 kiloms., and just before darkness compelled the suspension of flying for the day he made two flights unaccompanied of 4 mins. 36 secs., during which 5 kiloms. were traversed, and 4 mins. 4 secs. The flights were witnessed by Madame Bleriot and several prominent French aviators, including MM. Paul Zens, Goupy, Witzig, Blanchet and Stoeckel.

On the previous day M. Bleriot made several short flights, including one of about 2 kiloms. which was brought to a conclusion by a double turning in the form of the figure "8," which evoked loud applause from the spectators. During the afternoon M. Bleriot took up M. Guyot, the winner of last year's Voiturette Grand Prix, who turns the scale at 87 kilogs. and flew with him for about one and a half kiloms., at a height of seven metres.

On Tuesday, M. Bleriot was making some short flights with M. A. Fournier, when he landed very suddenly at the end of the last one and it was found afterwards that the crankshaft of the motor had fractured.

Mr. Latham has a Mishap.

LIKE all other exponents of flight, Mr. Latham has not been able to report uninterrupted progress. On Sunday afternoon, despite the strong wind, he determined to make a flight in order to demonstrate the machine to his mother, who had been away in Constantinople while he has been achieving flying triumphs. He had made a flight of over 3 kiloms. at a height of well over 10 metres when a violent gust of wind drove the machine to the earth and in consequence the left wing was damaged and the propeller bent. Mr. Latham escaped without injury. The repairs to the machine, however, were quickly made, and on Tuesday evening he flew for 12 mins., during which it is reported that he rose to a height of about 60 metres, from which he glided to earth.

On Saturday Mr. Latham was visited at Chalons by the Parliamentary Aviation Committee, and for their edification he made a flight of 49 kiloms. which were covered in 39 mins., according to the official timekeeper. At the conclusion of the flight, when at a considerable height, Mr. Latham cut off the ignition and glided to earth.

Mr. Latham and Crossing the Channel.

So confident is Mr. Latham of his ability to cross the English Channel before very long, that he has, it is said, laid wagers to a very large amount that he will perform the feat before July 15th. He has also made a number of bets that he will accomplish it by August 1st. Should the daring young aviator succeed in the project he will reap a rich harvest, for, in addition to the *Daily*

Mail prize of £1,000, there is the £500 offered by MM. Ruinat and several other prizes. The actual place of crossing is still undecided, but Mr. Latham will probably start from some point between Calais and Boulogne, and he would like to land at Folkestone for, as he quaintly puts it, he "has cousins there, and it would please them."

A Curious Accident at Juvisy.

THE programme for Sunday evening at the Juvisy aerodrome consisted of an attempt by M. de Rue to win the Rolland Gosselin Prize of 1,000 francs for the best time for 5 kiloms. After spending about an hour adjusting his machine, M. de Rue at last got it into working order and started off at 7.30 p.m. The course was marked out by six posts, and measured 1,666 metres round. Four times this course was traversed without incident, the 5 kiloms., according to the official timing of M. Surcouf, being covered in 5 mins. 34 secs., and then M. de Rue crossed the aerodrome with the intention of returning the biplane to its shed. He cut off the ignition, and was gliding down, when, while he was manipulating the rudder, his elbow caught the ignition-lever and re-started the motor. Before it could be stopped the biplane had picked up way again, and was driven full-tilt into the members' refreshment room. Fortunately, the aviator escaped unhurt, but the aeroplane itself was considerably damaged, the *fuselage* which carries the elevating-plane in front, and which bore the brunt of the collision, being completely broken.

Delagrangé at Argentan.

ALTHOUGH Delagrangé has not made any extraordinary flights at Argentan, those who have paid a visit to his flying ground there have witnessed some very good performances. On Wednesday week he flew for 4 kiloms. and on the following day he was again up for 2 kiloms. at a height of about 15 metres, in spite of a strong north wind, his evolutions being witnessed by a crowd of about 6,000 people. On Friday week, after a first flight of 1 kilom. at a height of only 3 metres, M. Delagrangé flew for 6½ kiloms. in as many minutes, during which he passed over a farm and a number of trees. A third flight of 6 kiloms. was also made, during which the aviator flew outside the bounds of his aerodrome. So impressed have they been with M. Delagrangé's flights that the Committee in charge of the arrangements have invited the aviator to pay another visit to Argentan, and he has promised to do so.

New-Comer at Chalons.

ON Tuesday last, Mr. Henry Cockburn, a member of the Aero Club of the United Kingdom, who has purchased a biplane from Mr. Henry Farman, made his first flight at Chalons, and although he started off well by flying for 500 yards, it ended in an accident. Apparently Mr. Cockburn pulled the wrong lever or pulled it in the wrong direction, for instead of the machine coming to earth it commenced to rise at a very sharp angle. As a result of the strain, the lifting-plane gave way, and the biplane fell. Mr. Cockburn escaped injury, but the machine was slightly damaged.

Doings at Juvisy.

DELAGRANGÉ, having returned from Argentan, was busy practising at Juvisy on Tuesday, and Rougier was

also endeavouring to attain greater skill with his Voisin machine. Having re-erected the Wright flyer with which he had been flying at Napoule, Comte Lambert prepared to make a new start at Juvisy on Monday. The machine had, however, only just got clear of the derrick when it fell to earth, apparently owing to the weight representing a passenger being placed out of balance. The left wing and screw were slightly damaged, but will soon be repaired. M. Tissandier is also putting together the Wright flyer which he used at Pau, and may be flying at Juvisy at any moment now.

Bleriot to go to St. Brieuc.

ARRANGEMENTS have been made by the Union Aerienne des Cotes du Nord for M. Bleriot to visit their aerodrome at Cesson and make exhibition flights on July 25th and the four following evenings, from 5 to 7 p.m.

Entries for Douai Meeting.

THE Ligue Aerienne du Nord announce that they have received eight entries for the contests which are to be held on the Brayelle aerodrome, Douai, from June 28th to July 18th. They include MM. Bleriot (monoplane), Tissandier (Wright flyer), Rougier, de Rue, Baron de Caters (Voisin biplanes), Jérôme (biplane carrying two persons), Bréguet (double monoplane carrying two passengers), Gobron (biplane).

M. Paulhan Flies at Bar-sur-Aube.

ON the 9th inst. M. Paulhan, who has been practising at Bar-sur-Aube with a Voisin biplane fitted with a Gnome engine, succeeded in making several flights, including one of about a kilometre in length at a height of ten metres. After the last flight the machine landed rather suddenly, and was slightly injured.

Curtiss Flying in America.

FROM cable messages received, it would appear that Mr. Curtiss, who was a member of the Aerial Experiment Association and made some of the first flights on the "June Bug" and "Silver Dart" aeroplanes, has now got his new aeroplane in going order. On the 8th inst., he made two flights of half a mile and one mile respectively. He is experimenting at Morris Park on the ground of the Aeronautic Society.

Prix Osiris Awarded to Aviation.

BY the award of the Institute of France in recognition of their work in furthering the cause of aviation, M. Bleriot and M. Gabriel Voisin share the Osiris prize of a value of about £4,000, which commemorates the wealthy art collector who presented to the French nation the Chateau Malmaison, the one-time residence of the Empress Josephine. This is now one of the very valued awards in France, and hall-marks successful pioneer endeavour—being somewhat on a par to the well-known Nobel prize. It is awarded once only in three years for the most useful achievement during that period. In selecting MM. L. Bleriot and Gabriel Voisin as the recipients of the 100,000 francs, for their work in building the machines which made the cross-country flights last October, and in thus lending very substantial encouragement to the latest field of scientific research, the Institute has earned the gratitude of everyone interested in human flight.

British Flight Industry Saved!

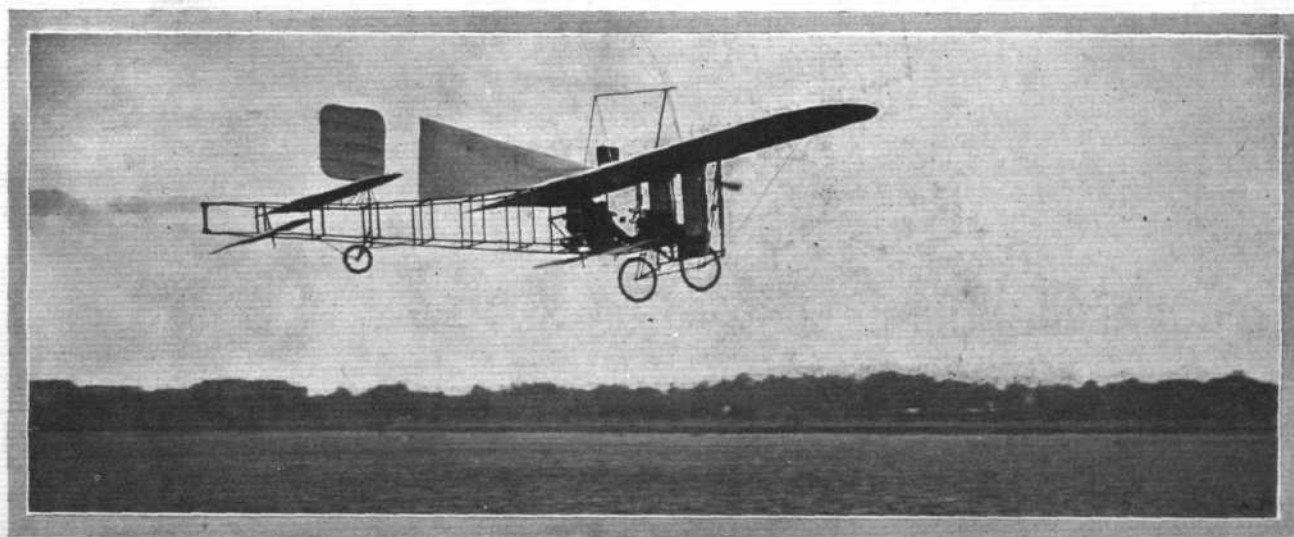
ACCORDING to a communication received from the Chancellor of the Exchequer, it appears that he has decided that aviators will be entitled to a rebate of the petrol duty on spirit used on their flying machines. No doubt the huge number of flyers in this country will hail this most important announcement with a feeling of intense relief.

An Ae.C.F. Aerodrome.

IT is announced by *Le Temps* that the Aero Club of France are considering a project for the establishment of an aerodrome quite close to Paris. The Lieusaint Plain on the east side of Paris is given as the site of the ground, which has an area of 500 hectares, and is quite open and suitable for the purpose.

Another Novel Prize.

AMONG the large number of 1,000-franc prizes which have been given to the Ligue Nationale, several have novel conditions attached to them. One—that given by M. Alphonse Combe—it has been decided shall be awarded to the aviator who shall, before July 14th next, have stayed up in the air for five minutes in the strongest wind over the Juvisy aerodrome. The force of the wind is to be measured in all cases with the same anemometer.



COMING OF THE MONOPLANE.—M. Bleriot, on his No. 12 machine, flying 6 kiloms. at Issy on June 12th, with a passenger on board.

at the same point of the ground. As the competitors have to hand in their entries in writing the night before the attempt is made, it should do a little to encourage aviators to pay a little more attention to meteorology, so as to have an idea as to what wind they are likely to meet on the morrow.

Wright Brothers at White House.

ON Thursday of last week the Wright brothers attended at the White House to receive from President Taft the gold medals awarded to them by the Aero Club of America. The ceremony was striking in its simplicity. The President, in the course of his speech, said that he declined to believe that the use of aeroplanes would be confined to war purposes, and he was amazed to find that his predecessor, President Roosevelt, with his phenomenal fearlessness, activity, and originality, had never undertaken to explore the upper regions of the air. In reply, Mr. Wilbur Wright expressed the thanks of himself and his brother, and said they must try to deserve the medals. They had only just begun their work, of which there was a great deal to do. The streets of Washington were decorated in honour of the visit of the two brothers, who were accompanied by their sister. On Thursday and Friday of this week Dayton, Ohio, the Wrights' native place, was *en fête* in celebration of the return of the famous brothers.

German Army Dirigibles.

THAT the German War Office treat the subject of military aeronautics seriously is shown by their latest order dealing with the command of the 1st Division, known as the Metz-Strasburg division of military dirigibles. It will be divided into two brigades, the Metz brigade consisting of one Zeppelin and one Parseval airship, and the Strasburg brigade, which will have a Zeppelin and either a Parseval or a Gross dirigible.

The Schütte Airship.

A FEW further particulars are gradually leaking out with regard to the Schütte airship, which is being built on somewhat similar lines to the Zeppelin, except that the rigid framework will be of wood instead of aluminium. The lifting capacity will, it is said, be about five tons, so that it should be possible to carry a large number of passengers. One of the more important features of the airship is the arrangement which has been made by the designer to retain the gas which is forced out of the balloon owing to expansion at high altitudes or the heat of the sun, and it is said that the airship will be able to ascend to a height of about 5,000 ft. without losing any gas. It is probable that the arrangement is to compress the gas into a chamber as it issues from the envelope, and, when the vessel descends, to allow this gas to flow back again. It is estimated that the dirigible, which is to be ready for trial by the autumn, will have a speed of 37 miles an hour.

CORRESPONDENCE.

* * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

LANGLEY V. LANCHESTER.

To the Editor of FLIGHT.

SIR,—Having read the article by Mr. Lanchester in your issue of May 22nd, I have taken particular notice of his remarks under the heading, "Langley's Error." With all due respect, I am of opinion that Mr. Lanchester is in error in his interpretation of Prof. Langley's law, as is apparent in the above-mentioned article.

Ballooning from Hurlingham.

IN view of the continuous rain on Saturday morning last, the Aero Club decided to postpone the point-to-point race for the Assheton Harbord Cup, but the weather clearing in the afternoon, several of the intending competitors decided to make an unofficial ascent. About half-past five the little "Comet" (2,500 cub. ft.) was sent off with Mr. B. H. Barrington Kennett in charge and a passenger, and a little later Mr. Griffith Brewer went up with Mr. E. C. Bucknall in the "Lotus" (3,500 cub. ft.). Then the new balloon, "L'Esperance," of 52,000 cub. ft. capacity, which has just been made by Messrs. Short Bros. for the Baroness von Heecheren, got away, the Hon. C. S. Rolls being in charge. Among the passengers were the owner, who was making her first balloon trip, Mr. Mortimer Singer, and Mr. Burnand. A fourth balloon to ascend was Mrs. Dunville's "La Mascotte" (50,000 cub. ft.), with Mr. C. F. Pollock as pilot, and Mrs. Dunville and the Hon. Mrs. Assheton Harbord as passengers. A strong wind was blowing from the N.N.E. at the start, but towards evening it veered round to N.N.W. Eventually, "L'Esperance" was brought down at Littlehampton, as close to the sea as it was safe to venture, and by a coincidence the party were joined on the train when returning to town by the party which had travelled in "La Mascotte," which had reached Angmering. Pulborough was the stopping-place of the "Lotus," and the "Comet" came down also in the same neighbourhood.

Balloon Race in America.

OUT of the six balloons which started in the race for the Grand Prize of America on Saturday week, the winner was Mr. Holland Forbes, who descended at Corinth, Mississippi, after covering 375 miles in 35 hours. The starting place was the interior of the new motor track which has been built at Indianapolis, on the lines of Brooklands. Of the other balloons the "Indiana," with Mr. Fisher in charge, remained in the air for 49 hours, but made a very short journey, only covering about 250 miles, landing eventually at Dickson, Tenn.

Ladies and Flower-bedecked Balloons.

ON Wednesday last, at St. Cloud, Parisians witnessed a sight which it is difficult to imagine could have taken place anywhere than at the French capital. It was the first meeting of the Stella Club, and five balloons which were to take the fair aeronauts aloft were ready inflated; but what a different appearance they wore to when mere man uses them to take the air. Each had been renamed after a flower, and the rigging and basket were charmingly decorated with a profusion of the flowers after which it was named, and the passengers had carefully chosen their costumes to match. The first balloon to go up carried three ladies, Mme. Surcouf, President of the Club, being the pilot. The second balloon was in charge of M. Decuges; while among the passengers on another balloon was Mme. Bleriot.

Prof. Langley certainly says, on page 108, in his book "Experiments in Aerodynamics," that "the most important and, it is believed, novel truth already announced immediately follows from what has been shown, that whereas in land or marine transport increased speed is maintained only by a disproportionate expenditure of power, *within the limits of experiment* in such aerial horizontal transport the higher speeds are more economical of power than the lower ones." But on pages 106 and 107 respectively we read: "The conclusions as to the weights which can be transported in horizontal flights have included the experimental demonstration that the air friction is negligible *within the limits of experiment*"; and footnote to second edition: "If this last statement had not

been misunderstood it would seem superfluous to say that it refers not to an actual flying machine with the limitations on speed imposed in construction by guys, framing, &c., and by the loss in transmission of horse-power between that generated in the engine and that delivered in thrust speed. It refers to the ideal condition of the frictionless plane as closely determined by the foregoing experiments."

This means to say, that for surfaces without struts or stays, inside the speed limits of 24 metres per second and with a larger flying angle than 1° to 2° , the friction co-efficient is hardly noticeable in comparison to the sine of the angle, and can therefore be ignored. No doubt, if a still smaller angle were chosen the skin-friction would be noticeable; but this falls outside the limits of Prof. Langley's experiments, upon which he lays much stress, and it is therefore clear to see that Prof. Langley is more misunderstood than he is mistaken. I also notice a comparison between Mr. Lanchester's calculations and the actual results from the Voisin and Wright machines, to which I have to say that this can only be a coincidence, easily brought about by varying some of the unknowable constants introduced in Mr. Lanchester's formulas. For instance, his friction co-efficient, ξ , his angle co-efficient, ϵ , and constant, c . I only need to refer to his article in FLIGHT of January 9th, where he states: "It is possible that the co-efficient for the skin-friction, ξ , is less than 0.01; for these large surfaces and high velocities it is conceivably no more than half this value." (A fairly large variation of about 100 per cent.)

If we, for instance, take the figures given for the Wright machine in the same article we may write, skin-friction 20 lbs., total resistance 155 lbs., which means that about 13 per cent. of the total resistance is due to skin-friction, a comparatively small amount considering that we are still in doubt as to the value of the constant ξ .

Truly yours,
T. G. NYBORG.

[Some remarks on the subject of the above letter will be found in an article elsewhere.—ED.]

TO ENCOURAGE PIONEER AVIATORS.

To the Editor of FLIGHT.

SIR,—The list of suggested prizes from the pen of Mr. A. V. Roe, which appeared in your issue of the 12th inst., is a most admirable one, and one which, if in existence, would give an immense stimulus to the innumerable inventors whose scanty means are inadequate for them to experiment with, and to perfect a machine sufficiently to enable the arduous and hazardous feats to be attempted for which so many valuable prizes are offered. Urging on to lesser feats than those demanded by present prize donors would considerably hasten the extent of the immediate development of the "heavier-than-air" principle.

A prize for the second suggestion is already in existence. Mr. J. L. McKim, a member of the committee of the Aeroplane Club, has offered £100 to the first British aviator who flies 100 yards at a height of 10 feet upon a machine of entirely British construction, the flight to take place during 1909. Full information regarding the prize can be obtained from the Secretary of the Club.

It is to be hoped that the example set by Mr. McKim will be followed by others upon the suggested lines already referred to.

I am, SIR, yours faithfully,
ALFRED B. E. CHEESEMAN.

MODEL FLYERS—A CHALLENGE.

To the Editor of FLIGHT.

SIR,—I should be pleased to fly my monoplane against all comers. I think that the machines should be flown in four directions from a given point to show how machine acts at all quarters to the wind, and also that they shall be started upside down to show if they have lateral stability, which I hold is absolutely necessary in all machines. Of course, the machine must right itself from the upside down condition, and continue its flight without alteration of direction. I think that all should stake £1, and total to go to the best machine.

Yours truly,
W. F. HOWARD.

P.S.—I should be in favour of the competitors choosing the judges.

To the Editor of FLIGHT.

SIR,—As Mr. Streeter's letter flavours somewhat of an advertisement, I must absolutely contradict the statement that "New-Things" were the first to put model aeroplanes on the market for sale on a large scale.

It is now over twenty years since I first commenced the study of aeronautics, two years since I went right into the business (this was before the public knew such names as Farman or Wright), and considerably over twelve months since I put Clarke's flyers on the market, at which time I was prepared to supply in any quantities.

Since then, besides supplying the home trade, I have sent them to Holland, Germany, France, Spain, Italy, United States, Canada, South Africa, Australia, and New Zealand; and I am the inventor of the latest British model aeroplane and control.

Messrs. Gamage had also imported the French articles months before I heard of "New-Things," and your readers would do well to see their up-to-date selection.

I also noticed the foreign invasion at the Aero Show at Olympia, and "New-Things" at the Agricultural Hall, but I have not seen any fly over 30 ft., whereas I have a small shilling model, weighing under 1 oz., of Clarke's, which has flown over 300 ft. I have also seen one of Montford Kay's hand-gliders (without any motive power) travel a distance of 65 ft. I may say that Clarke's and Kay's machines are being exhibited at the White City and Earl's Court.

Yours truly,
V. GRIFFITHS.

To the Editor of FLIGHT.

SIR,—We have read with interest the challenges of some of your readers, and suggest a competition, open to all comers, to be held in the Stadium at the White City.

The competition to be for models:—

1. Length of flight.
2. Lateral stability.
3. All machines to be launched from the highest point of the Stadium to test longitudinal stability.
4. Machine to be thrown from north, south, east and west, from a given point, to test stability as regards direction to wind.
5. Entrance fee, say, 10s. for competitors.

We suggest the judges for the above competition be selected from the recognised aeronautical bodies.

As we are exhibiting in the Aeronautical Section at the White City, and have facilities for the testing of aeroplanes, we shall be pleased to hear from any reader interested in the above proposition.

We would suggest that all purchasers of any model flyer should insist upon a practical demonstration.

As we intend giving a series of practical tests daily with aeroplanes, propellers, &c., an opportunity presents itself to would-be purchasers to see for themselves an actual flight.

Re Mr. Cochrane's challenge for propellers. Why not have a competition in the Aeronautical Section, White City? We could supply necessary apparatus for any tests.

Yours faithfully,
W. B. CHIPPENDALE AND CO.

RE FLAPPING-WING MACHINES.

To the Editor of FLIGHT.

SIR,—Mr. Sidney H. Hollands makes a statement about no valve in the bird's wings. I wish to ask him how does he account for the words "no idle stroke" then. Firstly, if you take a broad view of the word valve, the twist of the wing for upward stroke is simply to miss air, which I think is covered by the name of valve. Secondly, if Mr. Hollands will take any bird's wings and push his hand upwards from beneath he will find resistance; but push from above, and he will find his fingers go right through. I do not think it needs much broadening out to call this a valve action.

Yours faithfully,
W. G. ROBERTSON.

To the Editor of FLIGHT.

SIR,—The writer of the article on flapping wings, in FLIGHT, May 29th, only touched the fringe of the subject. I have experimented extensively for several years with various forms of wings and gears for operating same, but unfortunately I cannot build a wing strong enough which will stand up to its work for any length of time when driven by power. My gear is driven by a 5-h.p. petrol engine and is capable of giving from 120 to 1,500 beats per minute, with a varying stroke from zero upwards. I have got the best results from a flexible feather, which is so constructed as to give a combined lift and forward thrust on the down stroke and a forward thrust on the up stroke. I feel confident there is a great future for the wing in combination with the screw propeller, but much time and money must yet be spent before it is perfected. For the present I am reluctantly compelled to give up my experiments in that direction. If any readers of FLIGHT have any wings they would like tested under power, I shall be very pleased to give them facilities to do so free of charge.

Yours faithfully,
WILLIAM COCHRANE.

PROPELLOR CHALLENGE.

To the Editor of FLIGHT.

SIR,—I am obliged for the courtesy of the replies in your issue of June 12th, all of which accede to my conditions except perhaps that

of Mr. Sidney H. Hollands. He desires that I fit up a propeller of other dimensions than the one in question, he holds aloof from "mere models," and one is surprised that his requirements are not even greater forgetting, as he conveniently does, the very considerable cost in time and money which such experiments invariably involve. He satirizes the inventor's part, and is not too polite as to his mental capacity for fulfilling the conditions of the test. The law that the weight of propellers increases as the cube of their linear dimensions applies as accurately to my propeller as to the propeller which Mr. Hollands suggests to be of practical size. It is not for me and quite beside my intention to state diameter and pitch, or, in other words, the certain special features of my propeller, the whole question resolves itself into a matter of the degree of efficiency that can be evolved from a given weight and h.p. If Mr. Hollands will considerately fall in with the conditions of my challenge which other men very distinguished in this branch consider both reasonable and practicable, I will endeavour at some future date to meet Mr. Hollands with a 4-foot propeller in any similar challenge he may make. I gladly answer the other queries. The boss on the propeller to be $\frac{3}{8}$ in. diameter, $\frac{3}{4}$ in. in length, to fit into a coupling on the motor, the propeller with boss complete not to exceed 6 ozs in weight, h.p. of motor one-eighth. Place and date can be arranged when challenger has his propeller ready, judge to be decided on by mutual agreement.

Yours faithfully,
WILLIAM COCHRANE.

STRINGFELLOW'S MODEL.

To the Editor of FLIGHT.

SIR,—Perhaps the following item of news may be of interest to you:—

"The Council of the Board of Education have accepted from Mr. Patrick Y. Alexander the relics of the first mechanically-propelled flying machine which flew, viz., Stringfellow's model of 1848."

These are at present in my care, but in course of a few days will find a place in the Victoria and Albert Museum, South Kensington.

Should you desire any further particulars, I shall be pleased to let you have them.

I am, yours truly,
C. H. M. A. ALDERSON.

SANTANDER AERO EXHIBITION.

To the Editor of FLIGHT.

SIR,—I beg leave to inform you that the Commercial Club of this town have passed a resolution to invite foreign competition for prizes open to all members of aero clubs, for displaying their inventions or taking part in matches to be organised at an international exhibition which will take place in Santander towards the end of August or the first fortnight of September next.

The municipal authorities have already voted a sum of money for this purpose, which will be supplemented by the tradespeople in general, so as to offer a sufficient inducement to foreigners to come over to Santander, and exhibitors or aviators are invited to communicate with me, in order to arrange terms and conditions under which they would be prepared to take part in an exhibition or match of flying machines.

Yours faithfully,
MANUEL PRIETO,
President.

Circulo Mercantil é Industrial.

GLIDERS.

To the Editor of FLIGHT.

SIR,—May I be allowed to suggest that you should publish at an early date an article on gliders?

The aeroplane is at present a luxury for the few, but I know of no reason why the glider should not become a popular instrument of sport. To a man who combines enthusiasm for aviation with a practical knowledge of carpentry, the cost should not exceed a few pounds, although, perhaps, the time required would be excessive. A few yards of wooden rail on a down grade would be useful for starting purposes, but the only *sine qua non* is a more or less precipitous hill with plenty of space at the bottom, and such hills are to be found in practically every part of the country.

I—in common with many other people in this district—find tobogganing a most exhilarating sport, and tobogganing, I fancy, is not to be compared with "gliding," while the element of personal danger—if reasonable precautions be taken—is scarcely greater. Again, while tobogganing is only possible during a few days of the year, "gliding" could be indulged in practically two days out of three, for in this district, at any rate, the wind seldom attains a dangerous velocity.

Again, to take a more practical view of the matter, it is an absolute fact that most of our leading aviators commenced their

initial experiments with gliders. It is only on a glider that a would-be Wilbur Wright or Farman can obtain the experience essential to managing a power-driven machine. And again, an accident to a glider is far less likely to be attended with serious consequences than to a motor-propelled flyer. Furthermore, the presence of experimental gliders throughout the length and breadth of the country will accustom the public mind to matters aerial, and arouse the interest and enthusiasm of the "man in the street."

I was much interested in your recent article, "Teaching the Young Idea," for I have been practically following out its precepts during the last twelve months. As a teacher and a scientist I have been giving lessons on every branch of aviation, from the time of Oliver the Monk and Jean Baptiste Dante to the present day, and we have formed a very successful aero club with an extremely enthusiastic following. Some of our members have constructed successful models of aeroplanes, and we hold annually three championships: (1) Best model aeroplane performance, (2) Best kite performance, (3) Best invention of the year. One of our members has a device for obtaining automatic stability, which certainly works well in a model, although I cannot say how it would turn out in a full-sized flyer.

This term we are contemplating the building of a glider, but are rather at a loss—owing to the scarcity of good text books—to procure reliable data. I can assure you, Mr. Editor, that if you only show us the way we at least will follow on, and I am certain the article would be read and put into practice by hundreds of others, so that "gliding" would become a prominent and useful sport in the near future.

Yours faithfully,
R. GRIMMER (Sec. A.H.S.Ae.C.).

Surbiton.

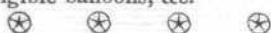
[Mr. Grimmer's letter has been unavoidably crowded out for some weeks. As will have been noticed by our readers, we have already published, amongst others, an article upon how to make a flyer; and we have in hand a series of other instructive and, we hope, helpful articles.—ED.]



NEW COMPANIES REGISTERED.

British National Airships, Ltd.—Capital £105,000 (100,000 £1 and 100,000 1s.). Under agreement with Spencer Syndicate, Ltd. Manufacturers, letters, hirers, repairers, and storers of and dealers in balloons, aeroplanes and airships, motors, machinery, implements, utensils, appliances, and apparatus, &c.

Rose and White, Ltd., 28, Frith Street, W.—Capital £10,000, in 9,900 preference shares of £1 each and 2,000 ordinary shares of 1s. each. Manufacturers of and dealers in motors and motor cars, accessory makers, &c., aeroplane manufacturers, makers of and dealers in dirigible balloons, &c.



Aeronautical Patents Published.

Applied for in 1908.

Published June 10th, 1909.

5,949. A. MUTTI AND R. L. MOND. Propelling apparatus.
28,119. A. PHILLIPS. Machines for navigating the air.

Applied for in 1909.

Published June 10th, 1909.

3,932. P. F. DEGN. Flying machines.
7,667. J. L. GARSED. Steering and balancing aerial machines.

FLIGHT.

44, ST. MARTIN'S LANE, LONDON, W.C.

Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

SUBSCRIPTION RATES.

FLIGHT will be forwarded, post free, to any part of the world at the following rates:—

UNITED KINGDOM.			ABROAD.		
	s.	d.		s.	d.
3 Months, Post Free ...	1	8	3 Months, Post Free ...	2	6
6 " " " ...	3	3	6 " " " ...	5	0
12 " " " ...	6	6	12 " " " ...	10	0

Cheques and Post Office Orders should be made payable to the Proprietors of FLIGHT, 44, St. Martin's Lane, W.C., and crossed London and County Bank; otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring FLIGHT from local news-vendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.

NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Thursday. The latest time for receiving small alterations for Advertisements is 12 noon, Thursday. No alterations can be made after that hour.